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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
COLLINS, CYNTHIA E	

ART UNIT	PAPER NUMBER
1638	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/566,644	PLESCH ET AL.	
	Examiner	Art Unit	
	Cynthia Collins	1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 May 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2,4,5 and 32-43* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2,4,5 and 32-43* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Applicant's submission filed on May 10, 2010 has been entered.

Claims 1, 3 and 6-31 are cancelled.

Claims 2, 4, 5, 32, 35 and 37 are currently amended.

Claims 38-43 are new.

Claims 2, 4-5 and 32-43 are pending and are examined.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

All previous objections and rejections not set forth below have been withdrawn.

Claim Objections

Claims 39 and 43 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 39 and 43 do not appear to further limit the subject matter of claims 2 and 35 because the processes of claims 2 and 35 already indicate that the process for the production of fine chemical comprises increasing or generating expression of at least one nucleic acid molecule in an organism or part thereof.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it

pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 2, 4-5, 32-33 and 38-39 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for increasing or generating the expression in a plant or a part thereof of a nucleic acid molecule which encodes a polypeptide having at least 95% sequence identity with SEQ ID NO:2 that confers an increase in the amount of fine chemical in a plant or a part thereof by introducing the nucleic acid molecule into the plant or the part thereof and the subsequent recovery of at least one fine chemical produced by the plant or a part thereof wherein the at least one fine chemical is selected from the group consisting of amino acids, carbohydrates, vitamins, organic acids, fatty acids, and carotenoids, does not reasonably provide enablement for the same process performed in other types of organisms or their parts. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

The claims are broadly drawn to a process for the production of fine chemical comprising stably increasing or generating in any organism or any part thereof the expression of at least one nucleic acid molecule comprising a nucleic acid molecule which encodes a polypeptide having at least 95% sequence identity with SEQ ID NO:2 that confers an increase in the amount of fine chemical in an organism or a part thereof, by introducing the nucleic acid molecule into the organism, and conferring an increase in the amount of the fine chemical in an organism or a part thereof, and growing the organism under conditions which permit the production of the fine chemical in the organism, and recovering the at least one fine chemical produced by the organism, wherein the at least one fine chemical is selected from the group consisting of amino

acids, carbohydrates, vitamins, organic acids, fatty acids, and carotenoids, including a process wherein the organism is selected from the group consisting of bacteria, fungi, algae, non-human animals and plants.

The specification discloses plants transformed with a nucleic acid molecule of SEQ ID NO:1 which encodes a polypeptide having the sequence of SEQ ID NO:2, and the subsequent recovery of at least one fine chemical produced by the transgenic plants wherein the at least one fine chemical is selected from the group consisting of amino acids, carbohydrates, vitamins, organic acids, fatty acids, and carotenoids (pages 182-189; page 174 Table 1). The specification does not disclose the recovery of at least one fine chemical produced by the other organisms or their parts subsequent to their transformation with a nucleic acid molecule of SEQ ID NO:1 which encodes a polypeptide having the sequence of SEQ ID NO:2.

The full scope of the claimed invention is not enabled because the types of fine chemicals that would be produced by the organisms other than plants subsequent to their transformation with a nucleic acid molecule which encodes a polypeptide having at least 95% sequence identity with SEQ ID NO:2 cannot be predicted on the basis of the types of fine chemicals that are produced by plants subsequent to their transformation with a nucleic acid molecule of SEQ ID NO:1 which encodes a polypeptide having the sequence of SEQ ID NO:2, since plant cells differ from other types of cells with respect to how RHO GTPases are regulated and function within them.

See, for example, Valster A.H. et al. (Plant GTPases: the Rhos in bloom. Trends Cell Biol. 2000 Apr;10(4):141-6. Review), who teach there are both similarities and differences in how Rho GTPases are regulated and used in plant versus animal and fungal cells. Valster A.H. et

al. teach that plant Rho GTPases (Rops), a distinct subfamily of the Rho family of GTPases, are distant cousins rather than near siblings of Rho GTPases found in other types of eukaryotic cells, and as such could be subject to different control mechanisms and might have adopted unique signaling roles, as suggested by their unexpected coprecipitation with an RLK complex, the apparent absence of expected key Rho GTPase regulatory proteins in plant sequence databases, and the presence of a unique targeting motif in one group of plausible Rho GTPase regulatory proteins known to be present in plants (page 142 Figure 1; page 146 Column 1).

See also, for example, Zheng Z.L. et al. (The Rop GTPase: an emerging signaling switch in plants. Plant Mol Biol. 2000 Sep;44(1):1-9), who teach that unique features in the effector domains of plant Rho GTPases (Rops) are consistent with the observation that plants appear to have few homologues of animal and yeast RHO effectors, and that the activation of Rop signaling may differ as well (page 2 column 1 second paragraph; page 7 column 1 last paragraph through page 8 column 1).

In the instant case the specification does not provide sufficient guidance with respect to which organisms or their parts, other than plants, would provide the appropriate cellular environment for the production of which types of fine chemicals subsequent to their transformation with a nucleic acid molecule which encodes a polypeptide having at least 95% sequence identity with SEQ ID NO:2. Absent such guidance one skilled in the art would have to randomly test a multitude of different non-plant organisms for the production of the vast array of fine chemicals encompassed by the claims in order to determine which non-plant organisms, if any, produce which type(s) of fine chemical(s) subsequent to their transformation with a nucleic acid molecule which encodes a polypeptide having at least 95% sequence identity with SEQ ID

NO:2, prior to the recovery of the fine chemical(s) from the non-plant organisms. Such a trial and error approach to practicing the claimed invention would constitute undue experimentation.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2 and 35, and claims 4-5, 32-34, 36-38 and 40-42 dependent thereon, are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 2 and 35 are indefinite in light of new claims 39 and 43. New claim 39 is drawn to the process of claim 2, wherein the expression of the at least one nucleic acid molecule confers the production of the at least one fine chemical in the organism or the part thereof. New claim 43 is drawn to process of claim 35, wherein the expression of the at least one nucleic acid molecule confers the production of the at least one fine chemical in the organism or the part thereof. It is unclear whether claims 39 and 43 are intended to further limit the subject matter of claims 2 and 35, because the processes of claims 2 and 35 already indicate that the process for the production of fine chemical comprises increasing or generating expression of at least one nucleic acid molecule in an organism or part thereof. Further, the specification does not disclose an alternative means for conferring the production of the at least one fine chemical in the organism or the part thereof when practicing the process as claimed. Accordingly, the scope of claims 2 and 35, and claims 4-5, 32-34, 36-38 and 40-42 dependent thereon, is unclear.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 35-37 and 40-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Qadota H. et al. (RHO gene products, putative small GTP-binding proteins, are important for activation of the CAL1/CDC43 gene product, a protein geranylgeranyltransferase in *Saccharomyces cerevisiae*. Yeast. 1992 Sep;8(9):735-41) in view of Polashock J.J. et al. (Expression of the Yeast Delta-9 Fatty Acid Desaturase in *Nicotiana tabacum*. Plant Physiol. 1992 Oct;100(2):894-901), Colau D. et al. (Complementation of a threonine dehydratase-deficient *Nicotiana plumbaginifolia* mutant after *Agrobacterium tumefaciens*-mediated transfer of the *Saccharomyces cerevisiae* ILV1 gene. Mol Cell Biol. 1987 Jul;7(7):2552-7), Hamill J.D. et al. (Over-expressing a yeast ornithine decarboxylase gene in transgenic roots of *Nicotiana rustica* can lead to enhanced nicotine accumulation. Plant Mol Biol. 1990 Jul;15(1):27-38), Von Schaewen A. et al. (Expression of a yeast-derived invertase in the cell wall of tobacco and *Arabidopsis* plants leads to accumulation of carbohydrate and inhibition of photosynthesis and strongly influences growth and phenotype of transgenic tobacco plants. EMBO J. 1990 Oct;9(10):3033-44), Londesborough et al. (U.S. Patent No. 5,792,921, issued August 11, 1998) and Hunt et al. (U.S. Patent No. 6,018,106, issued January 25, 2000).

Claims 35-37 and 40-43 are drawn to a process for the production of fine chemical comprising stably increasing or generating in an organism or a part thereof the expression of at

least one nucleic acid molecule comprising a nucleic acid molecule encoding of the polypeptide as depicted in SEQ ID NO:2 or a nucleic acid molecule comprising of the nucleic acid molecule as depicted in SEQ ID NO: 1, by introducing the nucleic acid molecule into the organism, and conferring an increase in the amount of the fine chemical in an organism or a part thereof, and growing the organism under conditions which permit the production of the fine chemical in the organism, wherein the organism is a plant, including a process wherein the at least one fine chemical is selected from the group consisting of amino acids, carbohydrates, vitamins, organic acids, fatty acids, and carotenoids.

Qadota H. et al. teach a process comprising stably increasing or generating in the yeast *Saccharomyces cerevisiae* (a fungus) the expression of at least one nucleic acid molecule obtained from *Saccharomyces cerevisiae* , wherein the nucleic acid molecule consists of a nucleic acid molecule (SEQ ID NO:1) encoding the polypeptide (RHO2) as depicted in SEQ ID NO:2 , by introducing the nucleic acid molecule into the yeast (page 736 column 1; page 737 Figure 1; page 738 Table 1 and Figure 2). The introduction of the nucleic acid molecule conferred an increase in the amount of a fine chemical (the RAS2 protein) in the organism, which was grown under conditions which permitted the production of the fine chemical (page 739 Figure 3).

Qadota et al. do not teach a plant.

Polashock J.J. et al. teach a process comprising stably increasing or generating in plants the expression of at least one nucleic acid molecule obtained from *Saccharomyces cerevisiae*, wherein the nucleic acid molecule consists of a nucleic acid molecule encoding delta-9 fatty acid desaturase, by introducing the nucleic acid molecule into plants. The introduction of the nucleic

acid molecule conferred an increase in the amount of a fine chemical (delta-9 fatty acid desaturase RNA as well as fatty acids) in the plants, which were grown under conditions which permitted the production of the fine chemical (page 896 Figure 3; pages 897-899 Figures 4-5 and Tables I-IV).

Colau D. et al. teach a process comprising stably increasing or generating in plants the expression of at least one nucleic acid molecule obtained from *Saccharomyces cerevisiae*, wherein the nucleic acid molecule consists of a nucleic acid molecule encoding threonine dehydratase, by introducing the nucleic acid molecule into plants. The introduction of the nucleic acid molecule conferred an increase in the amount of the fine chemical (threonine dehydratase) in the plants, which were grown under conditions which permitted the production of the fine chemical (page 2555 Figure 4).

Hamill J.D. et al. teach a process comprising stably increasing or generating in plants the expression of at least one nucleic acid molecule obtained from *Saccharomyces cerevisiae*, wherein the nucleic acid molecule consists of a nucleic acid molecule encoding ornithine decarboxylase, by introducing the nucleic acid molecule into plants. The introduction of the nucleic acid molecule conferred an increase in the amount of the fine chemical (ornithine decarboxylase RNA and protein as well as putrescine and nicotine) in the plants, which were grown under conditions which permitted the production of the fine chemical (pages 33-36 Figures 4-7).

Von Schaewen A. et al. teach a process comprising stably increasing or generating in plants the expression of at least one nucleic acid molecule obtained from *Saccharomyces cerevisiae*, wherein the nucleic acid molecule consists of a nucleic acid molecule encoding

invertase, by introducing the nucleic acid molecule into plants. The introduction of the nucleic acid molecule conferred an increase in the amount of the fine chemical (invertase as well as carbohydrates) in the plants, which were grown under conditions which permitted the production of the fine chemical (pages 3035-3036 Figure 3-4; pages 3038-3039 Table II and Figure 7).

Hunt et al. teach a process comprising stably increasing or generating in plants the expression of at least one nucleic acid molecule obtained from *Saccharomyces cerevisiae*, wherein the nucleic acid molecule consists of a nucleic acid molecule encoding yeast polyadenylate binding protein (yPAB), by introducing the nucleic acid molecule into plants. The introduction of the nucleic acid molecule conferred an increase in the amount of the fine chemical (yPAB) in the plants, which were grown under conditions which permitted the production of the fine chemical (column 9 lines 48-63).

Londesborough et al. teach a process comprising stably increasing or generating in plants the expression of at least one nucleic acid molecule obtained from *Saccharomyces cerevisiae*, wherein the nucleic acid molecule consists of a nucleic acid molecule encoding trehalose synthase, by introducing the nucleic acid molecule into plants. The introduction of the nucleic acid molecule conferred an increase in the amount of the fine chemical (trehalose synthase as well as trehalose) in the plants, which were grown under conditions which permitted the production of the fine chemical (Figure 24; column 49 Table 14).

Given the teachings of Qadota H. et al. that a nucleic acid molecule of SEQ ID NO:1 obtained from *Saccharomyces cerevisiae* encoding the polypeptide (RHO2) as depicted in SEQ ID NO:2 can be introduced into and expressed in the yeast *Saccharomyces cerevisiae*, and given the teachings of Polashock J.J. et al., Colau D. et al., Hamill J.D. et al., Von Schaewen A. et al.,

Hunt et al. and Londesborough et al. that a variety of different nucleic acid molecules obtained from *Saccharomyces cerevisiae* encoding a variety of different proteins can be introduced into and expressed in plants, it would have been *prima facie* obvious to one skilled in the art at the time the invention was made to introduce into and express in plants any known nucleic acid molecule obtained from *Saccharomyces cerevisiae* encoding a protein, including the nucleic acid molecule of SEQ ID NO:1 obtained from *Saccharomyces cerevisiae* encoding the polypeptide (RHO2) as depicted in SEQ ID NO:2 taught by Qadota H. et al. The use of a known nucleic acid molecule obtained from *Saccharomyces cerevisiae* encoding a protein, such as the nucleic acid molecule of SEQ ID NO:1 obtained from *Saccharomyces cerevisiae* encoding the polypeptide (RHO2) as depicted in SEQ ID NO:2 taught by Qadota H. et al, would have been a simple substitution of equivalent elements (nucleic acid molecules obtained from *Saccharomyces cerevisiae* encoding a protein) to obtain predictable results (expression of the nucleic acid molecule and encoded protein). Further, any additional effects, such as the production of specific fine chemicals including amino acids, carbohydrates, vitamins, organic acids, fatty acids, and carotenoids, would be inherent to the process as a consequence of expressing the nucleic acid molecule and encoded protein. Thus, the claimed invention would have been *prima facie* obvious as a whole to one of ordinary skill in the art at the time the invention was made.

Remarks

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Collins whose telephone number is (571) 272-0794. The examiner can normally be reached on Monday-Friday 8:45 AM -5:15 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg can be reached on (571) 272-0975. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Cynthia Collins/
Primary Examiner, Art Unit 1638

CC